

AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph starting at page 20, line 12 with the following amended paragraph:

In the production methods (1) to (4), a curable resin having the silicon-containing characteristic group and a thiourethane bond can be obtained by using a resin (Rb) having a mercapto group in the molecule in place of the resin (Ra) having a hydroxyl group. Here, the reaction between the resin (Rb) and the compound (CB) can be performed in accordance with the reaction method (1) above. Alternatively, the curable resin having the silicon-containing characteristic group and thiourethane bond is obtained by allowing the primary or secondary amino group of ~~polymercapro~~ aminothiol compound (~~v~~ w) to react with the isocyanate or thioisocyanate group of compound (cc), followed by allowing a mercapto group-containing compound (synthetic compound (v-C)) obtained above and a resin (Re) having an alkenyl group in the molecule to react at the mercapto group of the mercapto group-containing compound (synthetic compound (v-C)) with the alkenyl group of the resin (Re). The reaction between the polymercapro compound (v) and the compound (CC), and the reaction between the synthetic compound (v-C) and the resin (Re) may be performed in accordance with the reaction methods (1) and (2), respectively.

Please replace the paragraph starting at page 23, line 14 with the following amended paragraph:

The reaction between the resin (Rb) and the epoxysilane compound (h) in production method (6) can be performed in accordance with the reaction method (1) above. The reaction between the polymercapro compound (v) and the epoxysilane compound (h) in production method (7) can be performed in accordance with the reaction method (1) above,

and the reaction between the resin (Re) and the synthetic compound (v-h) in production method (7) can be performed in accordance with the reaction method (2) above. The reaction between the resin (Rc) and the epoxysilane compound (h) in production method (8) can be performed in accordance with the reaction method (1) above. The reaction between the resin (Rd) and the compound (CE) in production method (9) can be performed in accordance with the reaction method (1) above. The reaction between the resin (Ra, Rb or Rc) and the polyisocyanate compound (z), and the reaction between the glycidol compound (u) and the compound (CE), and the reaction between the synthetic compound (Ra-z, Rb-z or Rc-z) and the synthetic compound (u-E), each in production method (10), can be performed in accordance with the reaction method (1) above. The reaction between the compound (s) and the compound (CE) in production method (11) can be performed in accordance with the reaction method (1) above, and the reaction between the resin (Rb) and the synthetic compound (s-E) in production method (11) can be performed in accordance with the reaction method (2) above. The reaction between the resin (Rf) and the epoxysilane compound (h) in production method (12) can be performed in accordance with the reaction method (1) above.

Please replace the paragraph starting at page 31, line 31 with the following amended paragraph:

The above-mentioned resin (Rc) can be also prepared from the above-mentioned resin (Re) having an alkenyl group. An example of the method for synthesizing the resin (Rc) from the resin (~~Rd~~Re) is to add an aminothiols compound (compound (w)) having a mercapto group and a primary or secondary amino group in the molecule to the resin (Re) by a radical addition reaction. The radical addition can be performed in accordance with the reaction method (2) above.

Please replace the paragraph starting at page 61, line 1 with the following amended paragraph:

[Alkenylsilane compound (j)]

This compound has at least one silicon-containing characteristic group and at least one alkenyl group in the molecule, and includes reaction products (I j-1) to (I j-13) obtained by the following reactions.

Please replace the paragraph starting at page 73, line 10 with the following amended paragraph:

The reaction product (js-z) represented by general formula ~~b~~(87) above in the reaction of the mercapto group of a thiol compound represented by general formula (84) above with the isocyanate group of the compound (z) can be prepared according to the reaction method (1) described above. At this time, the reaction represented by the following general formula (104) progresses.

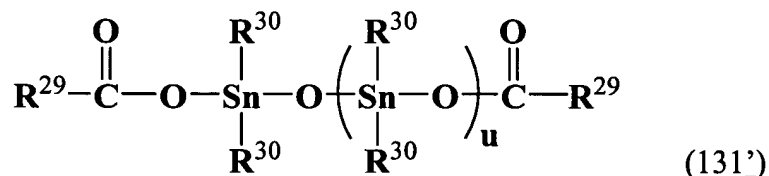
Please replace the paragraph starting at page 103, line 20 with the following amended paragraph:

Examples of the organic tin compounds include, but are not limited to, dibutyltin dilaurate, dioctyltin dilaurate, dibutyltin dimalate, dioctyltin dimalate, dibutyltin phthalate, dioctyltin phthalate, stannous octanoate, dibutyltin methoxide, dibutyltin dimethoxide, dioctyltin dimethoxide, dibutyltin diacetylacetate, dioctyltin diacetylacetate, dibutyltin diversatate, dioctyltin diversatate, reaction products from dibutyltin oxide and a phthalic diester, tin stearate and the like. Among the organic tin compounds above, dioctyltin compounds are particularly preferable, from the point of the curing speed of curable resin. In

addition, the dioctyltin compounds are known to be more stable than dibutyltin compounds commonly used and have fewer problems in danger and health hazard. In addition to the tin compounds exemplified above, the dioctyltin compounds include the compounds represented by the following general formulae (131') and (133') wherein R³⁰ is an octyl group; and the compounds wherein u is an integer of 0 to 5 is particularly useful.

Please replace the paragraph starting at page 104, line 2 with the following amended paragraph:

The following general formula (131') represents an organic tin compound usable as the second curing catalyst (D), and specifically shows a poly(dialkylstanoxane) dicarboxylate.



(wherein, R²⁹ and R³⁰ each represent a substituted or unsubstituted hydrocarbon group having 1 to 12 carbon atoms; u represents an integer of 1 or more; and R²⁹ and R³⁰ may be the same as or different from each other.)

Please replace the paragraph starting at page 104, line 17 with the following amended paragraph:

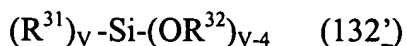
Typical examples of the poly(dialkylstanoxane) dicarboxylates represented by general formula (131') include, tetraalkyl distanoxane dicarboxylates such as 1,1,3,3-tetramethyl-1,3-bis(acetoxy)distanoxane, 1,1,3,3-tetramethyl-1,3-bis(butyryloxy)distanoxane, 1,1,3,3-tetramethyl-1,3-bis(octanoyloxy)distanoxane, 1,1,3,3-tetramethyl-1,3-bis(2-ethylhexanoyloxy)distanoxane, 1,1,3,3-tetramethyl-1,3-bis(lauroyloxy)distanoxane, 1,1,3,3-

tetrabutyl-1,3-bis(acetoxy)distanoxane, 1,1,3,3-tetrabutyl-1,3-bis(butyryloxy)distanoxane, 1,1,3,3-tetrabutyl-1,3-bis(octanoyloxy)distanoxane, 1,1,3,3-tetrabutyl-1,3-bis(2-ethylhexanoyloxy)distanoxane, 1,1,3,3-tetrabutyl-1,3-bis(lauroyloxy)distanoxane, 1,1,3,3-tetraoctyl-1,3-bis(acetoxy)distanoxane, 1,1,3,3-tetraoctyl-1,3-bis(butyryloxy)distanoxane, 1,1,3,3-tetraoctyl-1,3-bis(octanoyloxy)distanoxane, 1,1,3,3-tetraoctyl-1,3-bis(2-ethylhexanoyloxy)distanoxane, 1,1,3,3-tetraoctyl-1,3-bis(lauroyloxy)distanoxane, 1,1,3,3-tetra-lauryl-1,3-bis(acetoxy)distanoxane, 1,1,3,3-tetra-lauryl-1,3-bis(butyryloxy)distanoxane, 1,1,3,3-tetra-lauryl-1,3-bis(octanoyloxy)distanoxane, 1,1,3,3-tetra-lauryl-1,3-bis(2-ethylhexanoyloxy)distanoxane, and 1,1,3,3-tetra-lauryl-1,3-bis(lauroyloxy)distanoxane; hexaalkyl tristanoxane dicarboxylates such as 1,1,3,3,5,5-hexamethyl-1,5-bis(acetoxy)tristanoxane, 1,1,3,3,5,5-hexamethyl-1,5-bis(butyryloxy)tristanoxane, 1,1,3,3,5,5-hexamethyl-1,5-bis(octanoyloxy)tristanoxane, 1,1,3,3,5,5-hexamethyl-1,5-bis(2-ethylhexanoyloxy)tristanoxane, 1,1,3,3,5,5-hexamethyl-1,5-bis(lauroyloxy)tristanoxane, 1,1,3,3,5,5-hexabutyl-1,5-bis(acetoxy)tristanoxane, 1,1,3,3,5,5-hexabutyl-1,5-bis(butyryloxy)tristanoxane, 1,1,3,3,5,5-hexabutyl-1,5-bis(octanoyloxy)tristanoxane, 1,1,3,3,5,5-hexabutyl-1,5-bis(2-ethylhexanoyloxy)tristanoxane, 1,1,3,3,5,5-hexabutyl-1,5-bis(lauroyloxy)tristanoxane, 1,1,3,3,5,5-hexalauryl-1,5-bis(acetoxy)tristanoxane, 1,1,3,3,5,5-hexalauryl-1,5-bis(butyryloxy)tristanoxane, 1,1,3,3,5,5-hexalauryl-1,5-bis(octanoyloxy)tristanoxane, 1,1,3,3,5,5-hexalauryl-1,5-bis(2-ethylhexanoyloxy)tristanoxane, and 1,1,3,3,5,5-hexalauryl-1,5-bis(lauroyloxy)tristanoxane; and the like.

Please replace the paragraph starting at page 105, line 23 with the following amended paragraph:

In addition, poly(dialkylstanoxane) disilicate compounds, that are reaction products of a poly(dialkylstanoxane) dicarboxylate represented by general formula (131') with a silicate

compound represented by the following general formula (132'), are also usable as the second curing catalyst (D).



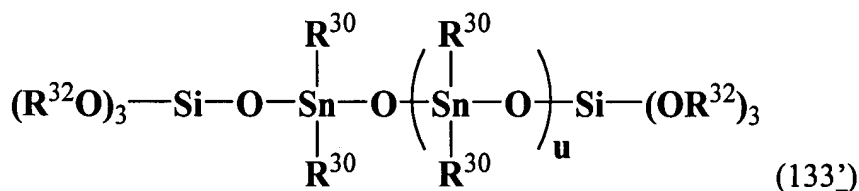
(wherein R^{31} and R^{32} each represent an alkyl group having 1 to 4 carbons; v represents an integer of 0 to 3; R^{31} and R^{32} may be the same as or different from each other; and a plurality of groups for each of R^{31} and R^{32} , if present, may be the same as or different from each other respectively.)

Please replace the paragraph starting at page 105, line 34 with the following amended paragraph:

Typical examples of the alkyl groups, R^{31} and R^{32} , in general formula (132') include methyl, ethyl, propyl, isopropyl, butyl, isobutyl, s-butyl and t-butyl. Typical examples of the silicate compound represented by general formula (132') for use include tetraalkoxysilanes such as tetramethoxysilane, tetraethoxysilane, tetrapropoxysilane, tetraisopropoxysilane and tetrabutoxysilane; trialkoxymonoalkylsilanes such as triethoxymethylsilane, triethoxyethylsilane, triethoxypropylsilane, triethoxyisopropylsilane and triethoxybutylsilane; dialkoxydialkylsilanes such as diethoxydimethylsilane, diethoxydiethylsilane, diethoxydipropylsilane, diethoxydiisopropylsilane and diethoxydibutylsilane; monoalkoxytrialkylsilanes such as ethoxytrimethylsilane, ethoxytriethylsilane, ethoxytripropylsilane, ethoxytriisopropylsilane and ethoxytributylsilane; and the like. Hydrolysates of these alkoxysilanes can also be used similarly.

Please replace the paragraph starting at page 106, line 15 with the following amended paragraph:

The reaction products from a poly(dialkylstanoxane) dicarboxylate represented by general formula (131') above and a silicate compound represented by general formula (132') above or the hydrolysate thereof can be obtained by heating the mixture at 100 to 130°C approximately for 1 to 3 hours and distilling the resulting carboxylic ester under reduced pressure. It is preferable then to perform the reaction at a ratio of 1 equivalence or more of alkoxy group with respect to 1 equivalence of carboxyl group and eliminate residual carboxyl group completely. Residual carboxyl group may deteriorate catalytic activity. The reaction may be performed in the presence or absence of a solvent, but is normally preferred to carry out in the absence of solvent. Typical examples of the reaction products, poly(dialkylstanoxane) disilicate compounds, include the compounds represented by the following general formula (133').



(wherein R^{30} , R^{32} and u are the same as the groups and numerical value specified above.)

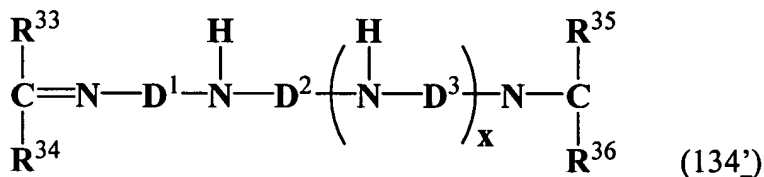
Please replace the paragraph starting at page 110, line 1 with the following amended paragraph:

The mercaptosilane compound (E) is a compound having a hydrolytic silyl or silanol group and ~~an amino~~ a mercapto group in the molecule. The silicon-containing functional group of the curable resin (A) activated by the catalytic action of curing catalyst (B) interacts with and binds to the mercaptosilane compound (E), so that the ~~amino~~ mercapto silane compound (E) functions as a crosslinking element, with improving the curing efficiency and the adhesiveness of the curable resin (A). The mercaptosilane compound (E) and the

mercapto compound (F), that are raw materials for the curable resin (A) described above, may be used for it.

Please replace the paragraph starting at page 122, line 29 with the following amended paragraph:

(1) Compounds represented by the following general formula (134') and the derivatives thereof, wherein the derivatives are, for example, compounds obtained by reacting the secondary amino group of a compound represented by general formula (134') with a compound having an epoxy group.



(wherein R^{33} , R^{34} , R^{35} and R^{36} each independently represents a group selected from the group consisting of a hydrogen atom, alkyl groups having 1 to 6 carbons, a phenyl group and phenyl groups containing an alkyl group having 1 to 6 carbons; D^1 , D^2 and D^3 independently represent an alkylene group having 2 to 6 carbons, respectively; and x is 0 or 1.)

Please replace the paragraph starting at page 123, line 15 with the following amended paragraph:

Examples of the compounds represented by general formula (134') include, but are not limited to, 2,5,8-triaza-1,8-nonadiene, 2,10-dimethyl-3,6,9-triaza-2,9-undecadiene, 2,10-diphenyl-3,5,9-triaza-2,9-undecadiene, 3,11-dimethyl-4,7,10-triaza-3,10-tridecadiene, 3,11-diethyl-4,7,10-triaza-3,10-tridecadiene, 2,4,12,14-tetramethyl-5,8,11-triaza-4,11-

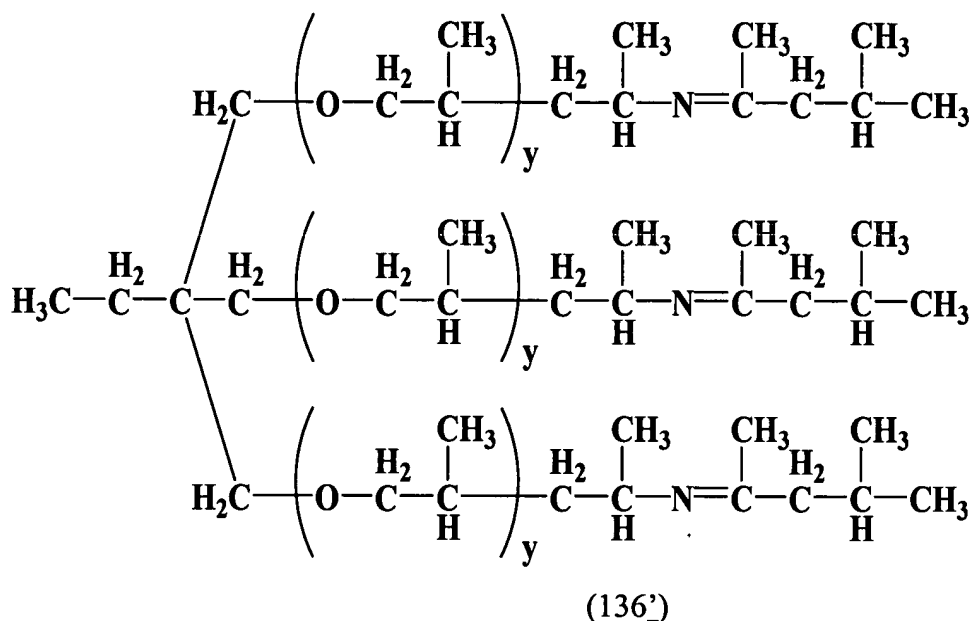
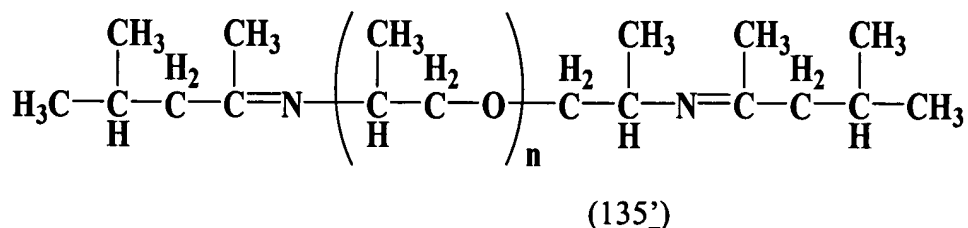
pentadecadiene, 2,4,20,22-tetramethyl-5,12,19-triaza-4,19-trieicosadiene, 2,4,15,17-tetramethyl-5,8,11,14-tetraaza-4,14-octadecadiene, and the like.

Please replace the paragraph starting at page 123, line 24 with the following amended paragraph:

Examples of the compound having an epoxy group, which is used in the reaction with the secondary amino group of the compound represented by general formula (134'), include styrene oxide, butyl glycidyl ether, allyl glycidyl ether, p-tert-butylphenyl glycidyl ether, p-sec-butylphenyl glycidyl ether, m- and p-cresyl glycidyl ethers, p-cresyl glycidyl ether, vinylcyclohexane dioxide, versatic glycidyl ester, cardanol-modified glycidyl ethers, dimer acid glycidyl ester, 1,6-hexanediol diglycidyl ether, resorcinoglycidylether, propylene glycol diglycidyl ether, 1,4-butanediol diglycidyl ether, neopentylglycol diglycidyl ether, and the like. In particular, styrene oxide derivatives are preferable. The ketimine derivative of compound (1) used may be a compound prepared by reacting an epoxy group-containing compound with only one of two imino groups on the compound represented by the structural Formula above.

Please replace the paragraph starting at page 124, line 7 with the following amended paragraph:

The compounds (1) also include the compounds represented by the following general formulae (135') and (136'). Here, in the following general formula (135'), n is a number of 1 to 6. In addition, in the following general formula (136'), x, y and z may be the same as or different from each other, and $x+y+z$ is approximately 5.3.



Please replace the paragraph starting at page 164, line 13 with the following amended paragraph:

From comparison between Examples 55 and 56 and Comparative Examples 11 and 12 shown in Table 17, it is obviously understood that the hardening speed is quite high when a boron trifluoride piperidine complex was used than when a dialkyltin compound was used, as the curing catalyst for the curable resins B-24 and B-25 having a silicon-containing functional group and a polar component. The acceleration of curing by the boron trifluoride piperidine complex was observed independent of whether the silicon-containing functional group was a bifunctional group (curable resin B-25) or a trifunctional group (curable resin B-24), and in particular, presence of urethane bond, substituted urea bond and secondary amino

group as the polar components in the molecule is effective in increasing the effect, as shown in Examples 55 to ~~36~~ 56. It is probably because the polar component in curable resin withdraws the BF_3 piperidine complex in the neighborhood of the polar components and increase reaction frequency, thus cuasing increase in the curing speed.